

PCI Strategies in Patients with STEMI and Multivessel Coronary Artery Disease

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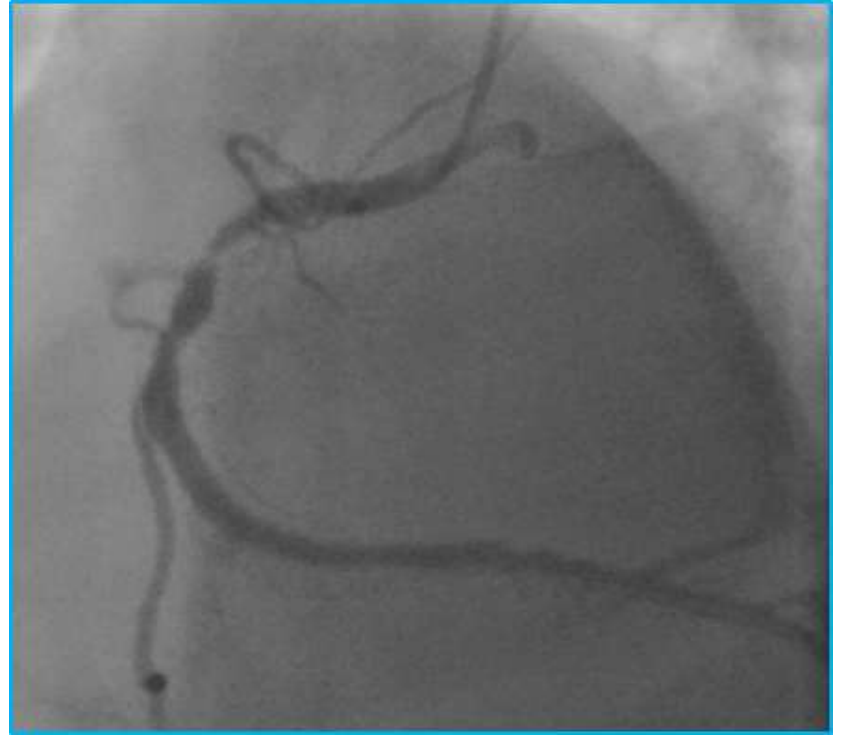
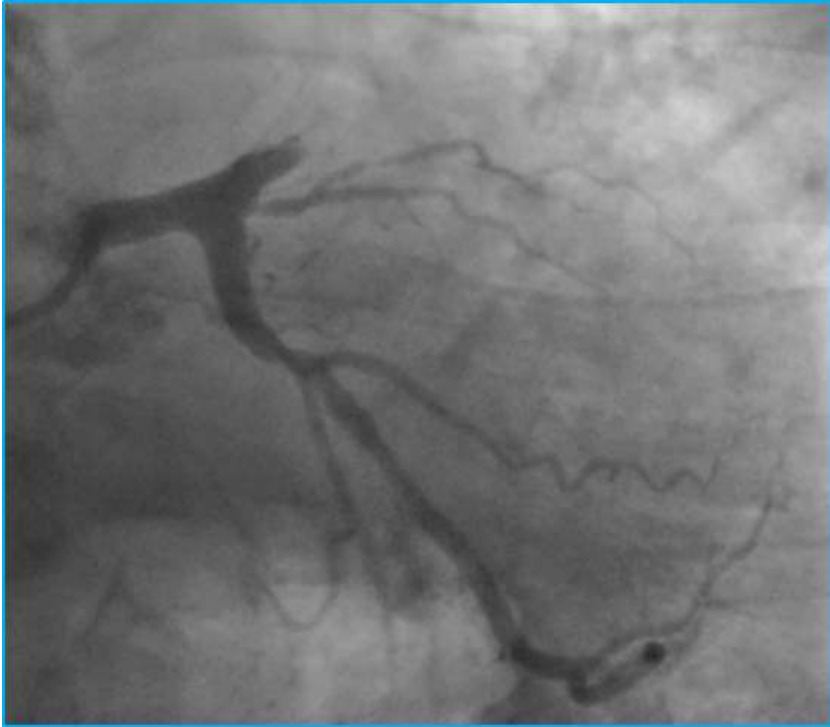
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Case:

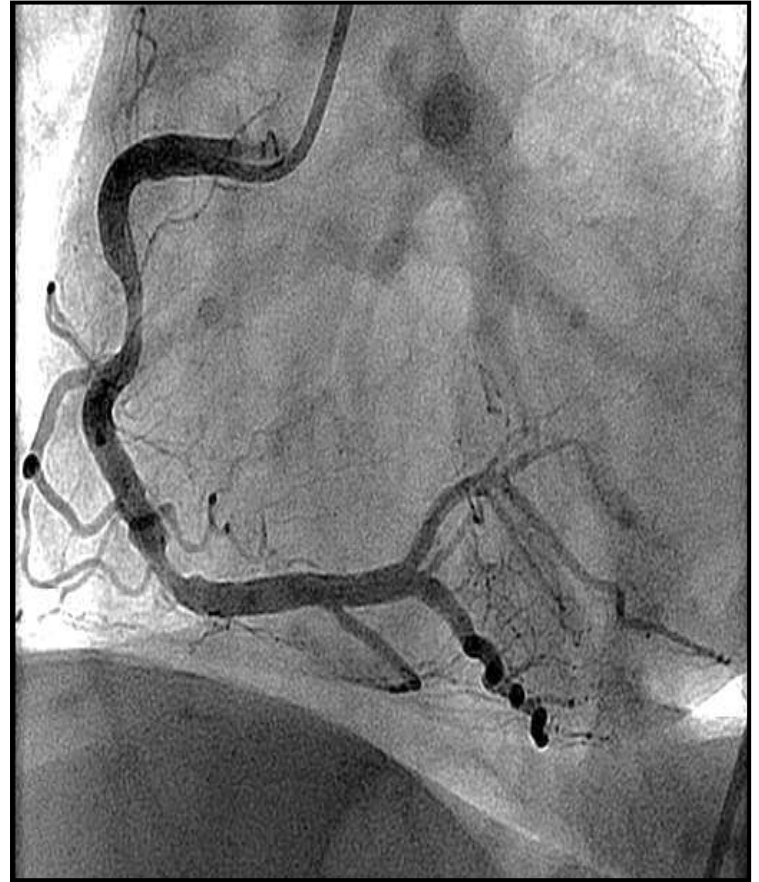
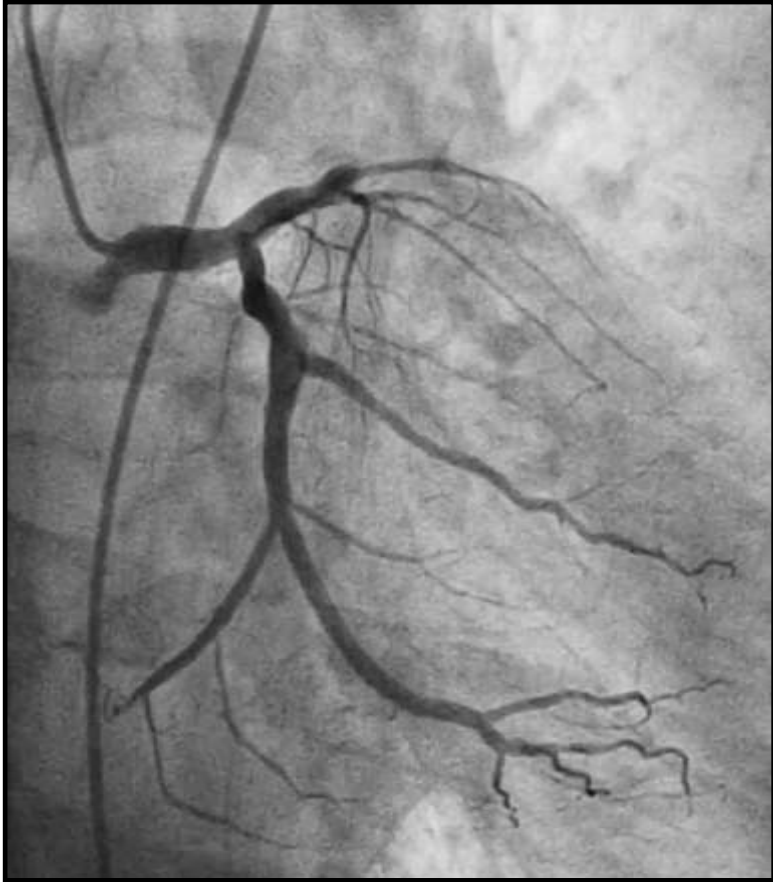
75 y/o man with anterior STEMI and MVD

- Should ticagrelor, prasugrel, clopidogrel, cangrelor, or a GPI be administered?
- Should UFH or bivalirudin be administered?
- Should radial or femoral artery access be used?
- Should aspiration thrombectomy be performed?
- Should a BMS or DES be implanted?
- Should multivessel PCI be performed acutely?
- Should multivessel PCI be staged?
- Should stress testing, FFR, or anatomy guide revascularization decisions?

Option 1



Option 2





STEMI and MVD



- 50% of STEMI patients have MVD
- Short-term prognosis worse
 - Additional plaque instability
 - Impaired microvascular perfusion
 - Decreased contractility in non-infarct zones
- Long-term prognosis worse
 - Older age
 - More risk factors
 - Lower LVEF



STEMI and MVD



More complete acute revascularization

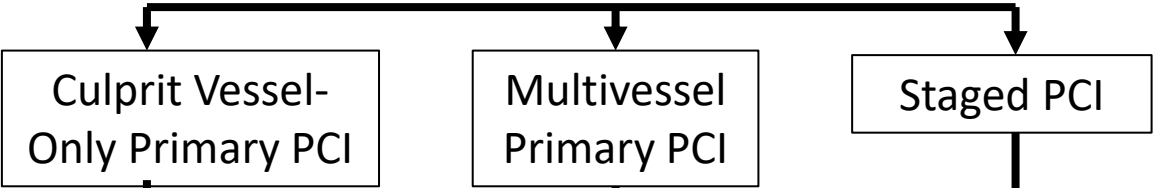
- May be safer in the current era due to advances in stent technology and antiplatelet therapy
- Might decrease mortality, reinfarction, and repeat revascularization rates
- Could reduce resource utilization and cost

STEMI and MVD: 3 PCI Options

1. Culprit-only primary PCI with continued medical management and PCI of nonculprit arteries only for spontaneous or stress-induced myocardial ischemia
2. MV PCI at the time of primary PCI
3. Culprit-only primary PCI followed by staged PCI of nonculprit arteries later during the index hospitalization or soon after hospital discharge



STEMI with MVD



Initial Procedure

Culprit vessel PCI

Culprit vessel PCI

Culprit vessel PCI

Non-culprit vessel PCI

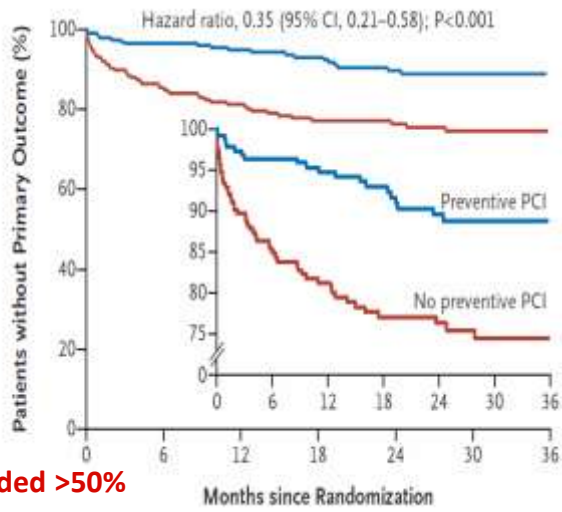
Days to Weeks Later

Non-culprit vessel PCI only for spontaneous ischemia or intermediate/high-risk findings on noninvasive testing

Non-culprit vessel PCI

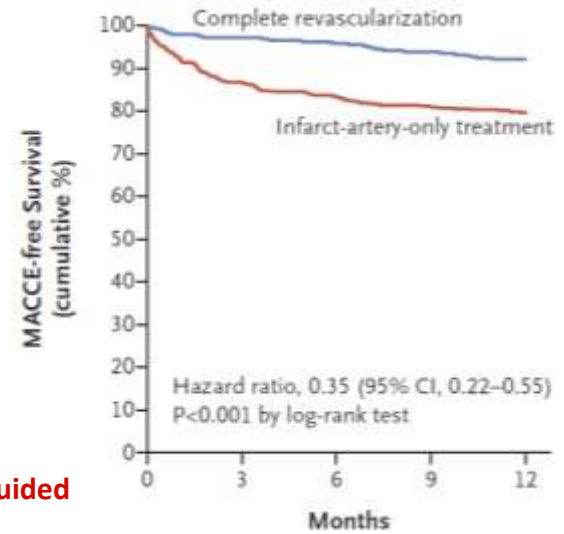
Pros	<ul style="list-style-type: none"> • Reduced contrast volume • Reduced risk of PCI complications 	<ul style="list-style-type: none"> • Decreased repeat revascularization risk • Decreased hospital LOS compared with staged PCI 	<ul style="list-style-type: none"> • More time to assess benefit/risk of non-culprit vessel PCI
Cons	<ul style="list-style-type: none"> • Increased repeat revascularization risk • Potentially reduced recovery of LV function 	<ul style="list-style-type: none"> • Prolonged procedure time • Increased contrast volume • Increased periprocedural MI risk • Potentially unnecessary PCI of functionally insignificant stenoses 	<ul style="list-style-type: none"> • Additional PCI access risks • Additional procedure costs

PRAMI Wald et al. *N Engl J Med* 2013;369:1115-23



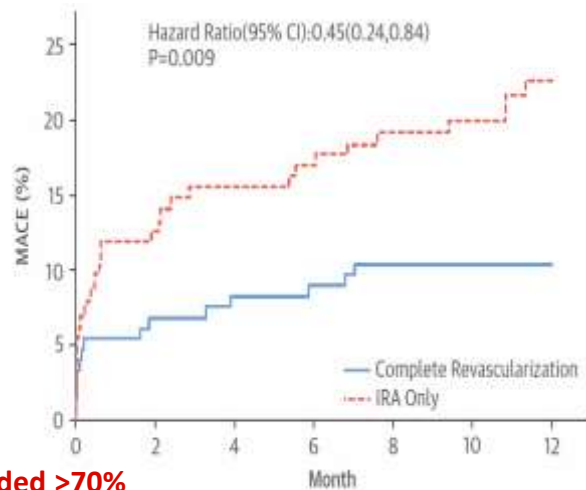
Angio-guided >50%

COMPARE-ACUTE Smits et al. *N Engl J Med* 2017;376:1234-44



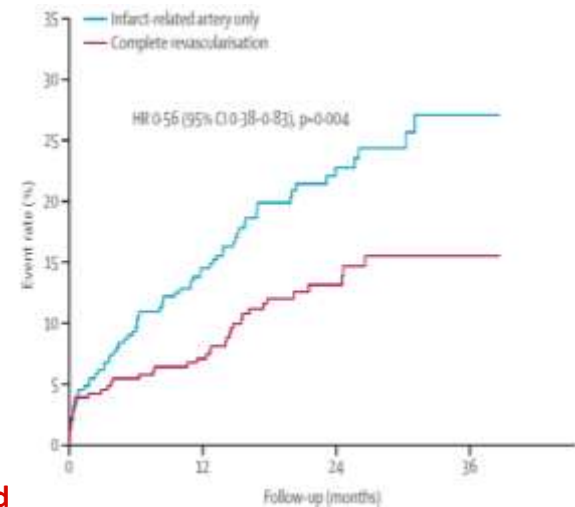
FFR-guided

CvLPRIT Gershlick et al. *J Am Coll Cardiol* 2015;65:963-72



Angio-guided >70%

DANAMI-3-PRIMULTI Engstrom et al. *Lancet* 2015;386:665-71



FFR-guided



Limitations of the Evidence Base



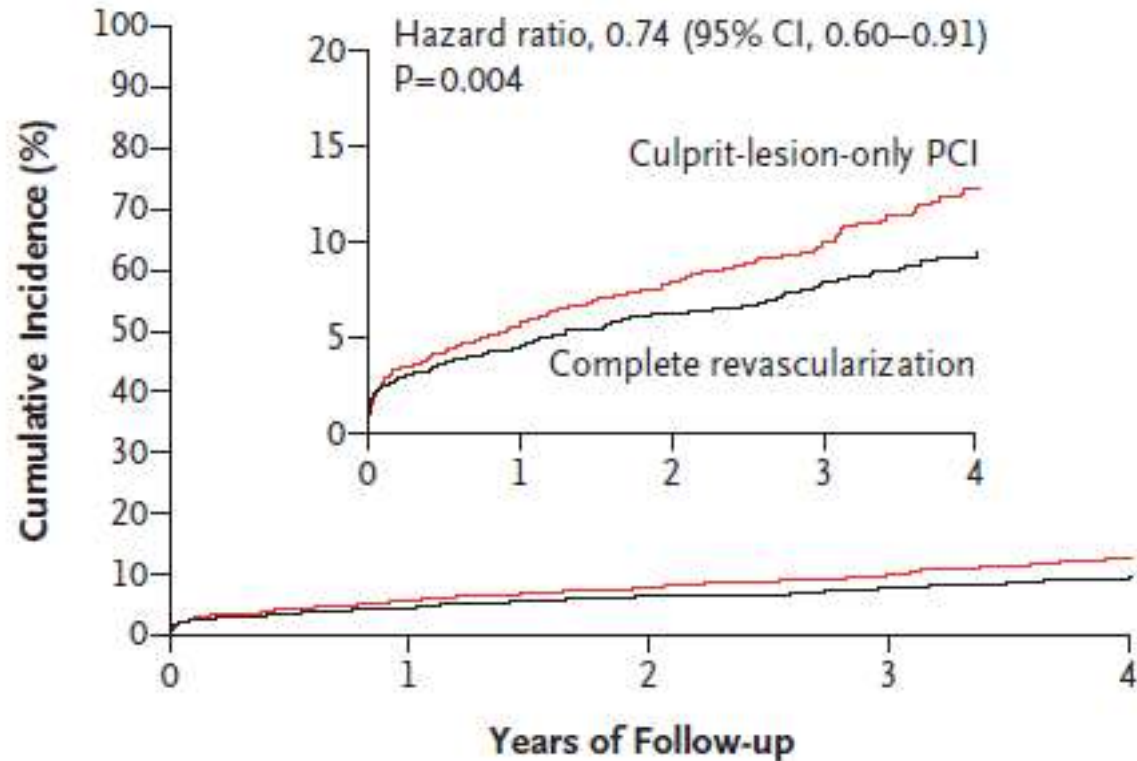
- Heterogeneous inclusion criteria, end points
- Open label, no core labs, no risk adjustment
- Selection bias, ascertainment bias, survival bias
- No data on patient or lesion inclusion criteria
- No data on timing of revascularization
- No data on completeness of revascularization
- RCTs overestimate benefit
- Observational studies confounded
- Meta-analyses worthless

Culprit Vessel-Only vs Multivessel P-PCI

COR	Recommendation
IIb B	PCI of a noninfarct artery may be considered in selected patients with STEMI and multivessel disease who are hemodynamically stable, either at the time of primary PCI or as a planned staged procedure.

COMPLETE Trial: CV Death, MI

A First Coprimary Outcome

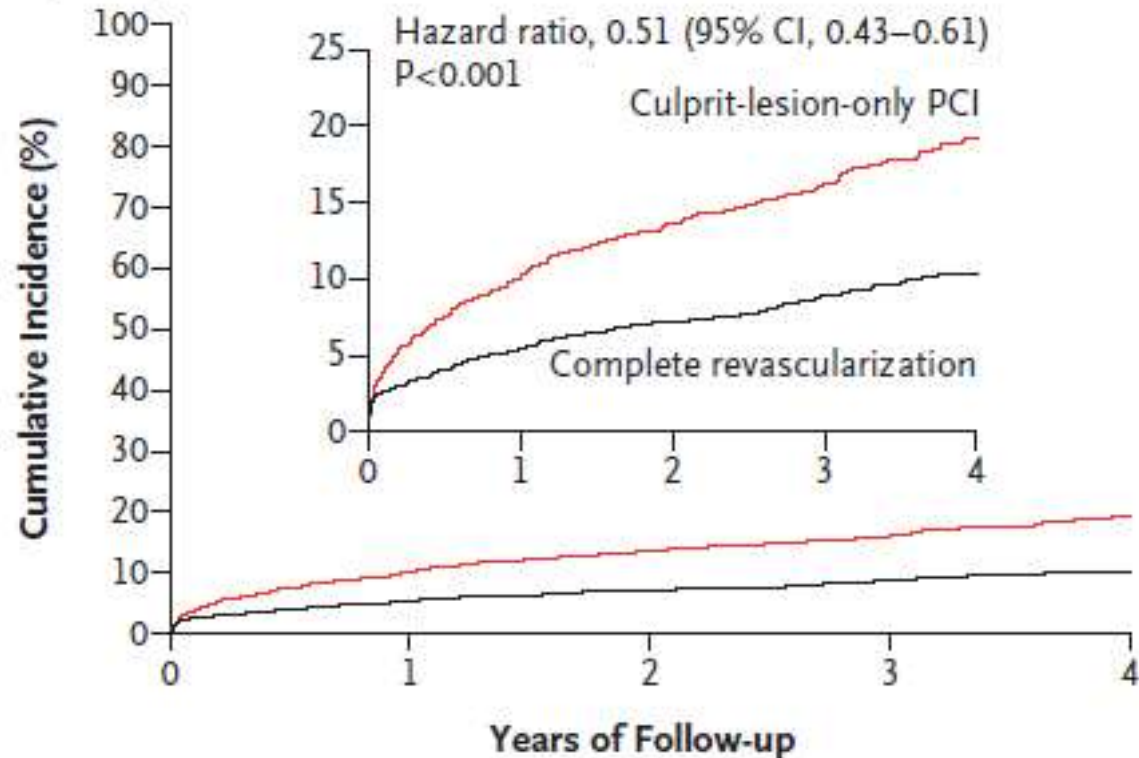


No. at Risk

Culprit-lesion-only PCI	2025	1897	1666	933	310
Complete revascularization	2016	1904	1677	938	337

COMPLETE Trial: CV Death, MI, TVR

B Second Coprimary Outcome



No. at Risk

Culprit-lesion-only PCI	2025	1808	1559	865	294
Complete revascularization	2016	1886	1659	925	329

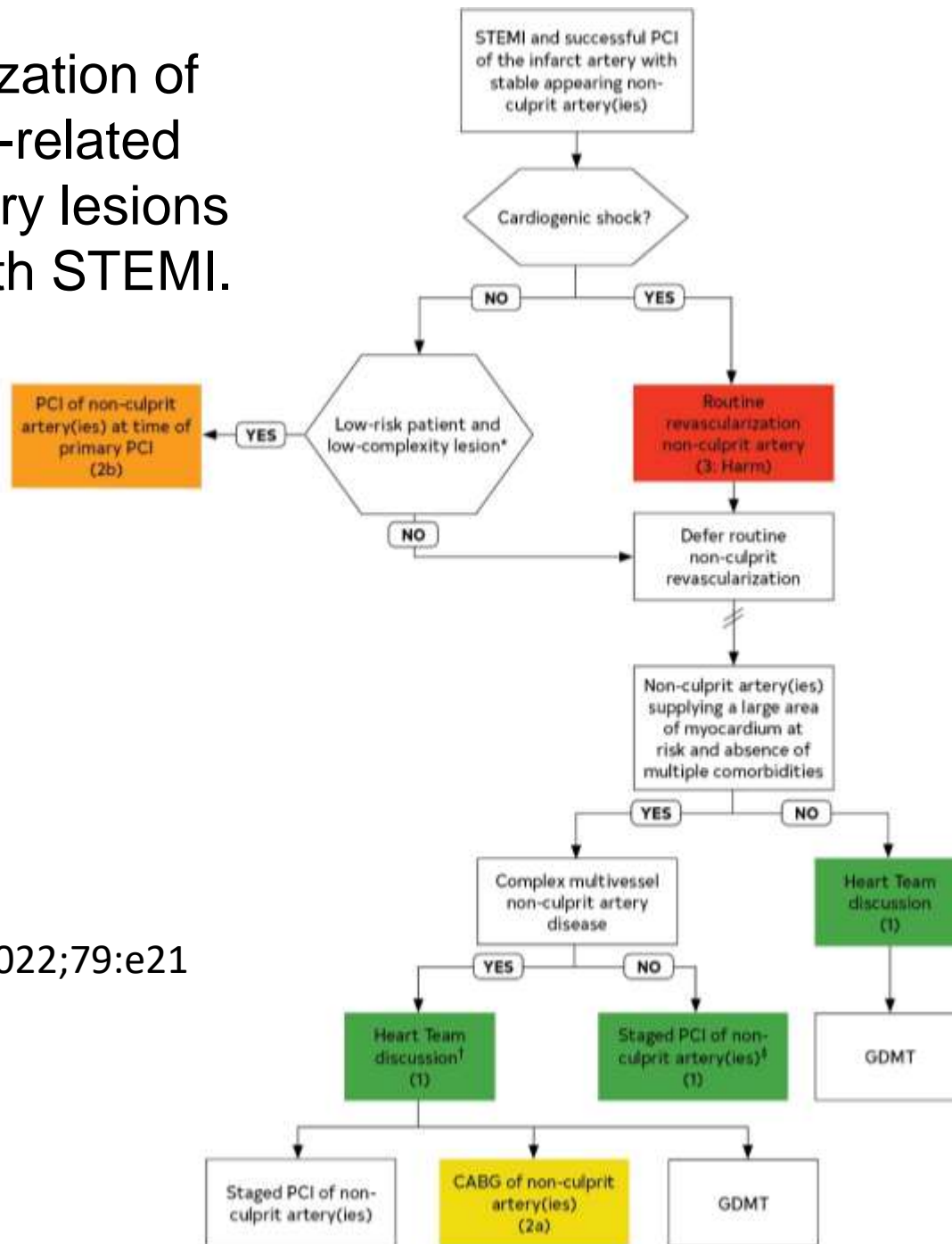
Revascularization of the Non-Infarct Artery in Patients With STEMI

COR	LOE	Recommendations
1	A	1. In selected hemodynamically stable patients with STEMI and multivessel disease, after successful primary PCI, staged PCI of a significant non-infarct artery stenosis is recommended to reduce the risk of death or MI.

Revascularization of the Non-Infarct Artery in Patients With STEMI

2a	C-EO	2. In selected patients with STEMI with complex multivessel non-infarct artery disease, after successful primary PCI, elective CABG is reasonable to reduce the risk of cardiac events.
2b	B-R	3. In selected hemodynamically stable patients with STEMI and low-complexity multivessel disease, PCI of a non-infarct artery stenosis may be considered at the time of primary PCI to reduce cardiac event rates.
3: Harm	B-R	4. In patients with STEMI complicated by cardiogenic shock, routine PCI of a non-infarct artery at the time of primary PCI should not be performed because of the higher risk of death or renal failure.

Revascularization of non-infarct-related coronary artery lesions in patients with STEMI.



Lawton JS, et al.
 J Am Coll Cardiol 2022;79:e21



My Conclusions



- MV PCI is feasible and probably safe
- MV PCI probably reduces death and MI rates
- FFR does not impact death or MI rates
- Not for intermediate, CTO, or complex lesions
- Need stable hemodynamics, careful case selection, normal renal function
- Proper timing is unclear
- Nonculprit PCI indication should match elective PCI standards